

What is claimed is:

1. An expression method for non-naturally-occurring amino acid-containing protein comprising: expressing in animal cells:

(A) a mutant tyrosyl-tRNA synthetase that is a derivative of tyrosyl-tRNA synthetase originating from *E. coli* with an enhanced specificity for a non-naturally- occurring tyrosine derivative as compared with the specificity for tyrosine;

(B) suppressor tRNA originating in *Bacillus* species, *Mycoplasma* species or *Staphylococcus* species of eubacteria and capable of binding with the tyrosine derivative in the presence of the mutant tyrosyl tRNA synthetase; and,

(C) a desired protein gene that has undergone a nonsense mutation at a desired site;

wherein, the tyrosine derivative is incorporated in response to the created nonsense codon.

2. The expression method according to claim 1 wherein the tyrosine derivative is a position 3-substituted tyrosine or position 4-substituted tyrosine.

3. The expression method according to claim 1 or 2 wherein the suppressor tRNA of (B) is suppressor tyrosine tRNA originating in *Bacillus stearothermophilus*.

4. The expression method according to any of claims 1 to 3 wherein the mutant tyrosyl tRNA synthetase of (A) is a mutant TyrRS that has undergone an alteration at the location corresponding to tyrosine at position 37 and glutamine at

position 195 of tyrosyl tRNA synthetase.

5. The expression method according to claim 4 wherein the mutant tyrosyl tRNA synthetase of (A) is a mutant TyrRS in which the location corresponding to tyrosine (Y) at position 37 of tyrosyl tRNA synthetase is substituted with valine (V), leucine (L), isoleucine (I) or alanine (A), and the location corresponding to glutamine (Q) at position 195 of tyrosyl tRNA synthetase is substituted with alanine (A), cysteine (C), serine (S) or asparagine (N).

6. The expression method according to any of claims 1 to 5 wherein the animal cells are mammalian cells.

7. A non-naturally-occurring amino acid-containing protein production method comprising: recovering and purifying a protein expressed according to any of the methods according to claims 1 to 6.

8. Animal cells containing:

(A) an expression vector that expresses in animal cells a mutant tyrosyl-tRNA synthetase that is a derivative of tyrosyl tRNA synthetase from *E. coli* with an enhanced specificity for a non-naturally-occurring tyrosine derivative as compared with the specificity for tyrosine;

(B) an expression vector that expresses in the animal cells a suppressor tRNA originating in a *Bacillus* species, *Mycoplasma* species or *Staphylococcus* species of eubacteria capable of binding with the tyrosine derivative in the presence of the mutant

tyrosyl tRNA synthetase; and,

(C) an expression vector that expresses in the animal cells a desired protein gene that has undergone a nonsense mutation at a desired site; wherein,

the tyrosine derivative is incorporated at the site of the nonsense mutation of the protein.

9. The animal cells according to claim 8 wherein the tyrosine derivative is a position 3-substituted tyrosine or position 4-substituted tyrosine.

10. The animal cells according to claim 8 or 9 wherein the suppressor tRNA of (B) is suppressor tyrosine tRNA originating in *Bacillus stearothermophilus*.

11. The animal cells according to any of claims 8 to 10 wherein the mutant tyrosyl tRNA synthetase of (A) is a mutant tyrosyl tRNA synthetase that has undergone an alteration at the location corresponding to tyrosine at position 37 and glutamine at position 195 of tyrosyl tRNA synthetase.

12. The animal cells according to claim 11 wherein the mutant tyrosyl tRNA synthetase of (A) is a mutant TyrRS in which the location corresponding to tyrosine (Y) at position 37 of tyrosyl tRNA synthetase is substituted with valine (V), leucine (L), isoleucine (I) or alanine (A), and the location corresponding to glutamine (Q) at position 195 of tyrosyl tRNA synthetase is substituted with alanine (A), cysteine (C), serine (S) or asparagine (N).

13. The animal cells according to any of claims 8 to 12 that are mammalian cells.

14. DNA having a sequence selected from the group consisting of SEQ. ID NO. 1, SEQ. ID NO. 30, SEQ. ID NO. 31 and SEQ. ID NO. 32.

15. An expression vector capable of being expressed from a control sequence recognized in animal cells comprising a sequence selected from the group consisting of SEQ. ID NO. 1, SEQ. ID NO. 30, SEQ. ID NO. 31 and SEQ. ID NO. 32.

16. The expression vector according to claim 15 that carries nine copies of DNAs having the sequence of SEQ. ID NO. 1 in the same direction.